Patent Claims

1. Arrangement for the acceptance or return of objects (9) for which a deposit has been paid or can be paid and/or of objects (9) pertaining to a lending system, at least provided with an at least readable identification code, characterized by

- an acceptance zone (1) for the intake or positioning of the object (9) to be accepted,
- a reading device (2) in order to ascertain the association of the object with a specific deposit or a lending system,
- a transporting device (3) which is operationally connected with the reading device such that, after the object's association has been positively ascertained, it is transported further, as well as
- at least one blocking member (4, 27) through which, upon positive ascertainment by the reading device, the object is transported.

2. Arrangement as claimed in claim 1, characterized in that at the blocking member (4, 27) means are provided, such as a latching element, automatic closing means or the like, in order to at least impede the backward movement of the object after its passage.

3. Arrangement as claimed in one of claims 1 or 2, characterized in that at the blocking member (4, 27) monitoring means (15), such as light barriers, pressure transducers, position sensors, etc., are provided in order to control the blocking member (4, 27) and to detect the backward movement of the object.

4. Arrangement as claimed in one of claims 1 to 3, characterized in that the at least one blocking member (4, 27) comprises a swivel element, whose swivel action can only be actuated in the direction of transport and not in the opposite transport direction.

5. Arrangement as claimed in one of claims 1 to 4, characterized in that further an identification sensor (5) is provided in order to identify the accepted object (9) and, in the case of a redeemable object, to acquire the appropriate amount of redemption or, in the case of a lending system, to register the acceptance of the object and optionally the object itself.

6. Arrangement as claimed in claim 5, characterized in that the identification sensor and the reading device are identical or are accommodated in one and the same structural component.

7. Arrangement as claimed in one of claims 1 to 6, characterized in that the reading device (2) is disposed, in the direction of transport of the transporting device, in front of the blocking member (4) and the identification sensor (5), succeeding the blocking member.

8. Arrangement as claimed in one of claims 3 to 7, characterized in that the monitoring means (15) in the proximity of the blocking member (4) comprises at least one position sensor, such as a light barrier or a pressure transducer, etc., which indicates whether or not an object is located in the proximity of the blocking member, and which optionally detects further whether the object has stopped or is moved backward.

9. Arrangement as claimed in one of claims 5 to 8, characterized in that the identification sensor (5) includes additionally a writing device in order to change optionally data on a rewritable code or label, such as an RFID tag disposed on an object, and/or to transmit data to this code or label.

10. Arrangement as claimed in one of claims 1 to 9, characterized in that the reading device (2) and the identification sensor (5), or optionally the writing device, read/acquire or transmit data in the radio frequency range.

11. Arrangement as claimed in one of claims 1 to 10, characterized in that in the proximity of the identification sensor (5) or, optionally succeeding in the direction of transport, a discharge zone for the identified or registered object is provided, in which discharge zone at least one further position sensor (11) is provided in order to detect the discharge of the object to a succeeding site or to ascertain a backward movement of an object.

12. Arrangement as claimed in claim 11, characterized in that in the discharge zone a further blocking member (74) is provided in order to detect or prevent a backward movement of the object.

13. Arrangement as claimed in one of claims 11 or 12, characterized in that in the discharge zone a cutting instrument (32) is provided which, during the transport of an object in the direction of the transporting device, can be folded or swiveled away and, in the event the object is transported in the opposite direction, is activatable for example by means of a spring, in order to sever removal aids, such as strings, cords and the like, employed to transport the object in the opposite direction.

14. Arrangement as claimed in one of claims 1 to 13, characterized in that an alarm signaling device is provided which is activatable in the event of improper use of the arrangement.

15. Arrangement as claimed in one of claims 1 to 14, characterized in that at least two blocking members (4, 74) are provided which are operationally connected with one another such that, in the manner of a lock, one of the two blocking members is always latched or is closed to the passage of an object.

16. Arrangement as claimed in one of claims 1 to 15, characterized in that in the acceptance zone for the intake or positioning of the object (9) to be accepted an additional blocking member (34) is provided, and in the proximity of the reading device (2) and optionally of the identification sensor (5), respectively, a downwardly swivelable base (27), such as for example a swivelable slide, is provided which is implemented such that, upon a positive ascertainment by the reading device, it can be unlatched and swiveled downwardly.

17. Arrangement as claimed in claim 16, characterized in that the additional blocking member (34) disposed in the acceptance zone is operationally connected with the downwardly swivelable base such that, when the base is folded down, the further blocking member is closed or latched.

18. Arrangement as claimed in one of claims 1 to 17, characterized in that the arrangement comprises a lock-like chamber (46), into which the object (9) to be detected can be placed and in which the object can be identified by means of the reading device (2), and that at the lock-like chamber (46) at least two reclosable chamber walls or blocking members (44, 47) are disposed, which are operationally

connected with one another such that at least one blocking member is always closed, and that upon a positive ascertainment or recognition of the object by the reading device (2) the blocking member (47) succeeding the lock-like chamber (46) can be unlatched in order to make possible the further transport of the object (9), which optionally can be identified by the identification sensor (5).

19. Arrangement as claimed in one of claims 1 to 18, characterized in that adjoining the acceptance zone (1) a sorting device is provided comprising one or several sorting units (51, 53, 55) in order to sort the accepted objects.

20. Arrangement as claimed in claim 19, characterized in that the sorting facility comprises sorting units (51, 53, 55) largely operating autonomously, each comprising a transporting belt (63), preferably each driven by a driving motor (65), with at least one sensor being assigned to each sorting zone for acquiring the object and optionally its position, and preferably each sensor and/or a sorting unit control being electrically and/or logically, optionally wirelessly, for example by means of WLAN (Wireless Local Area Network), connected at least with the acceptance arrangement or with its one reading device (2) and/or an identification sensor (5).

21. Arrangement as claimed in one of claims 19 or 20, characterized in that preferably each sorting unit is provided with an RFID reader or interrogator and/or with at least one light sensor and/or one position encoder disposed on the particular driving motor of each sorting unit.

22. Arrangement as claimed in one of claims 19 to 21, characterized in that each sorting unit comprises at least one so-called tilt sorter unit, which, in the case of several units, are arrayed in series one after the other, i.e. placed in succession.

23. Arrangement as claimed in claim 22, characterized in that at each tilt sorter the particular conveyor belt, viewed in the direction of transport, is swivelable either to the left or to the right, such that an object disposed on the conveyor belt can be swiveled either to the left or the right, for example into a container or a receptacle (52, 52').

24. Arrangement as claimed in one of claims 22 or 23, characterized in that the driving motor (65) of the particular conveyor belt (23) of each tilt sorter, as well as also a tilt motor (27) provided for tipping, are each provided or connected with a position encoder, in order to be able to acquire the position of the object on the belt and the particular swivel angle or reset angle to be selected, in order to swivel the conveyor belt back into the starting position.

25. Arrangement as claimed in one of claims 19 to 24, characterized in that in the acceptance zone (1), in addition to the reading device (2), an optical waveguide (11) and a position encoder are disposed at the transporting device (3) for acquiring the length of the returned object in order to transfer the measured length to a control at the particular sorting unit for the sorting or tilting in the correct position of the accepted object.

26. Arrangement as claimed in one of claims 19 to 25, characterized in that the sorting units (51, 53, 55) are logically and/or electronically connected with one another and with the acceptance arrangement, and consequently with the reading device (2), and the connection can take place by means of a CAN bus.

27. Arrangement as claimed in one of claims 1 to 26, characterized in that the acceptance arrangement, and consequently functionally also the sorting units, are

provided with an external data base or a local data base, on which are stored the data relevant for the arrangement or acceptance station and/or those of lent or released objects.

28. Method for the acceptance or return of objects for which a deposit has been paid or can be paid and/or of objects pertaining to a lending system, at least provided with an at least readable identification code, characterized in that at an acceptance zone for the intake or positioning of the objects to be accepted by means of a reading device the association of an object to a specific deposit or lending system is ascertained, subsequently a transporting device, operationally connected with the reading device, upon the positive ascertainment of the association of the object, is activated in order to transport the object through a blocking member which, upon positive ascertainment by the reading device, is unlatched or opened for the through-transport of the object.

29. Method as claimed in claim 28 for the acceptance or return of several objects and/or one object containing several object units, characterized in that the reading device acquires the number of accepted or returned objects or object units and displays this number visually and/or acoustically, whereupon the person or the consumer entering the objects or units confirms the acquired number or rejects it, whereupon, in the event of rejection, the transport further or the processing further of the object and/or of the units is interrupted and/or the object or the units are returned to the person or the consumer.

30. Method as claimed in one of claims 28 or 29, characterized in that the accepted or returned object(s) are acquired based on the data exclusively identifying the particular object, such as serial number, identification code, etc. and these data are

stored in a negative list, i.e. a list of items no longer authorized to be accepted, and these data are optionally matched or exchanged with another acceptance arrangement, the term of validity of the entries in the negative list being defined according to the particular application purpose.

31. Method as claimed in one of claims 28 to 30 and/or for the operation of an arrangement as claimed in one of claims 1 to 27, characterized in that, in the case the object entered into the acceptance station is authorized to be accepted, for the verification, or for the definition of a subsequent sorting of the object, data must be called up from an external data base, to shorten the data call-up or, in the event of poor response times in an EDP network or if possibly temporarily no connection is available, the acceptance arrangement or the accepting zone can be operated in off-line mode in that information from the external data base regarding all objects acquired in the data base or, alternatively, all information regarding lent/released objects are periodically downloaded onto a local acceptance data base at the acceptance arrangement.

32. Method as claimed in one of claims 28 to 31, characterized in that the object(s) upon positive ascertainment by the reading device is transferred to a sorting device comprising one or several sorting units in order to sort the returned or accepted objects, and that the individual sorting units are driven by the acceptance arrangement or reading device such that a possible sorting action is triggered at the particular sorting unit in order to process or sort out the object to be sorted at the particular sorting unit.

33. Method as claimed in one of claims 28 to 32, characterized in that at least at one or at several sorting units an intelligent control is provided and that these sorting

units are operated largely independently or autonomously, such that from the acceptance arrangement or the reading device sorting information regarding the object to be processed is transmitted to the sorting units, and, in conjunction with the sorting information, the object is independently processed or sorted at the particular sorting unit or transported further to a further sorting unit.

34. Use of the arrangement as claimed in one of claims 1 to 27 for a lending system, such as for a library system for lending books, CDs, cassettes, videos, maps, magazines, etc.

35. Sorting facility for sorting various objects, in particular suitable for an acceptance arrangement as claimed in one of claims 1 to 27, characterized by several, preferably largely autonomously operating sorting units (51, 53, 55) with at least two sorting paths for sorting out the objects, each sorting unit comprising at least one transporting belt (63), preferably driven by a driving motor (65), as well as one tilt sorter device for each sorting unit provided in order to tilt off the transporting belt, viewed in the direction of transport, to the left or to the right in order to tilt away, for example into a receptacle, an object located on the transporting belt to be sorted out at a specific sorting unit.

36. Sorting facility as claimed in claim 31 characterized in that to each sorting unit at least one sensor is assigned, which is preferably electrically and/or logically connected with a reading device and/or a further sensor in an intake zone of the sorting facility, and the sensor can be an identification sensor, such as for example a light sensor, an RFID reader or interrogator, as well as also a position encoder, disposed on the particular driving motor of the transporting belt of each sorting unit.